

Post-Processing versus Real-Time GNSS Challenging Perspectives for CORS

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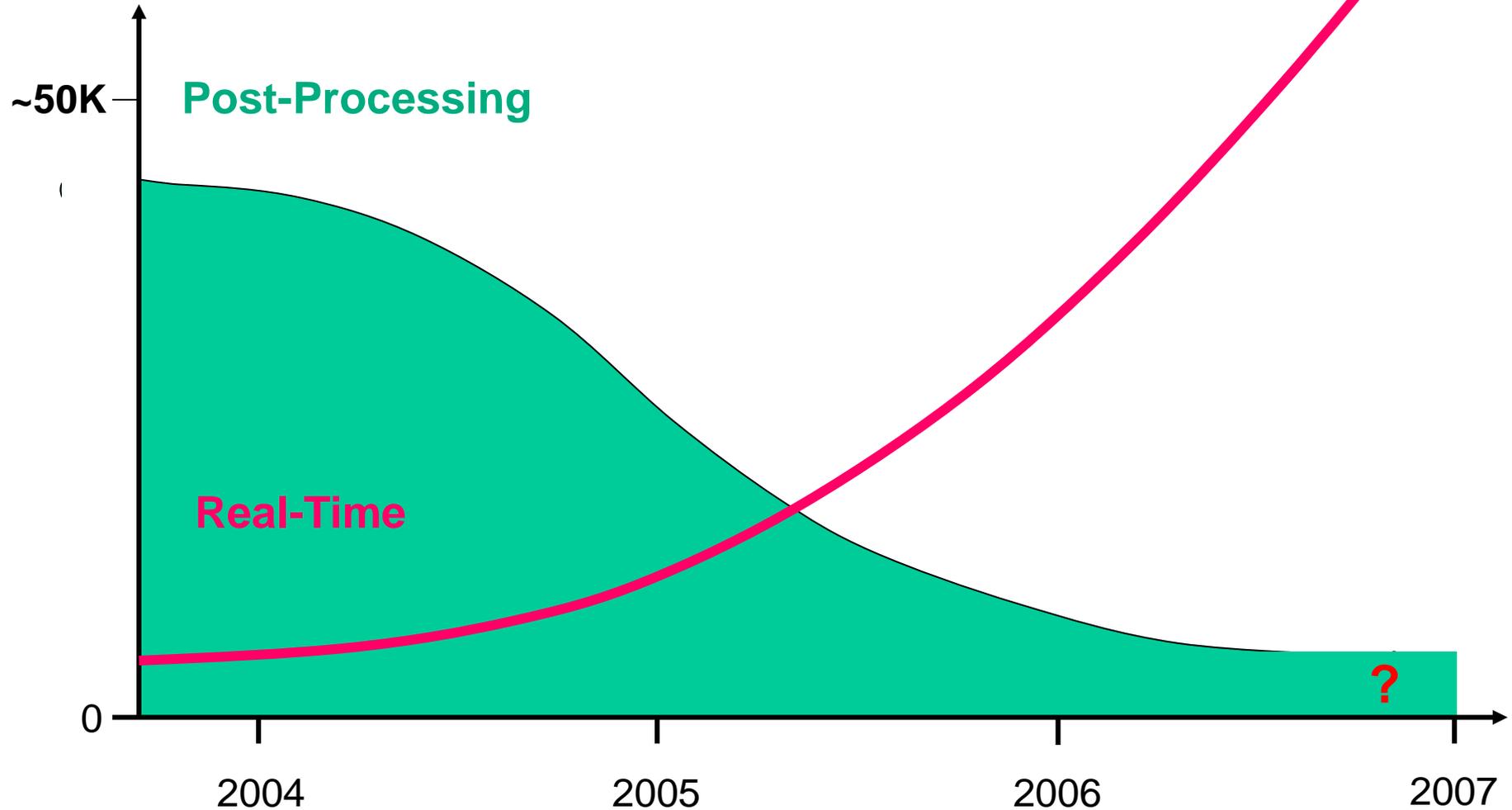
CORS User Forum, 13 September 2006, Long Beach, CA

Status

- The number of post-processing GNSS users decreases rapidly.
- At the same time, the community of real-time users grows dramatically.
- With the exception of high precision reference system maintenance, very soon there will remain only a few positioning applications carried out in a post-processing mode.

Post-Processing vers. Real-Time

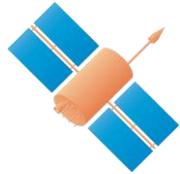
Geod. Receiver Units



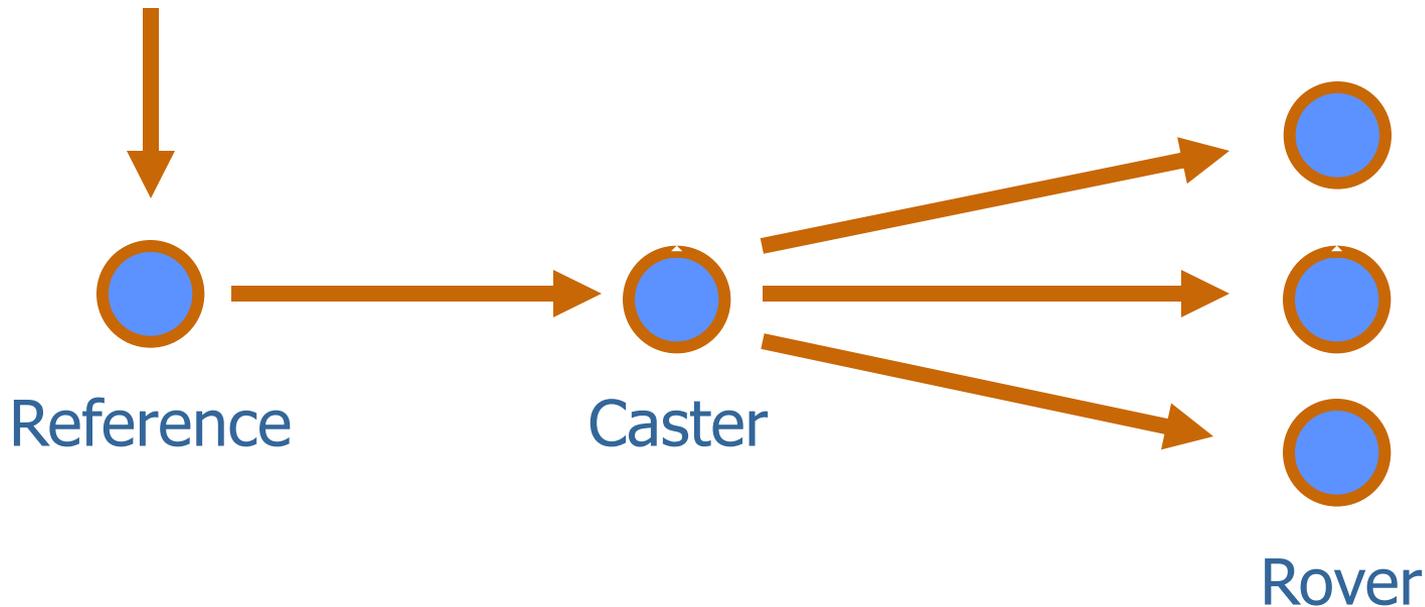
The Challenge

- Is NGS/CORS running out of business?
- So far mainly post-processing oriented, public providers are requested to extend services towards real-time.
- How shall NGS/CORS cope with the new situation? Should it add new products to its portfolio and what could they be?
- What may be the appropriate technology to follow?
- What could be an appropriate policy to align to?

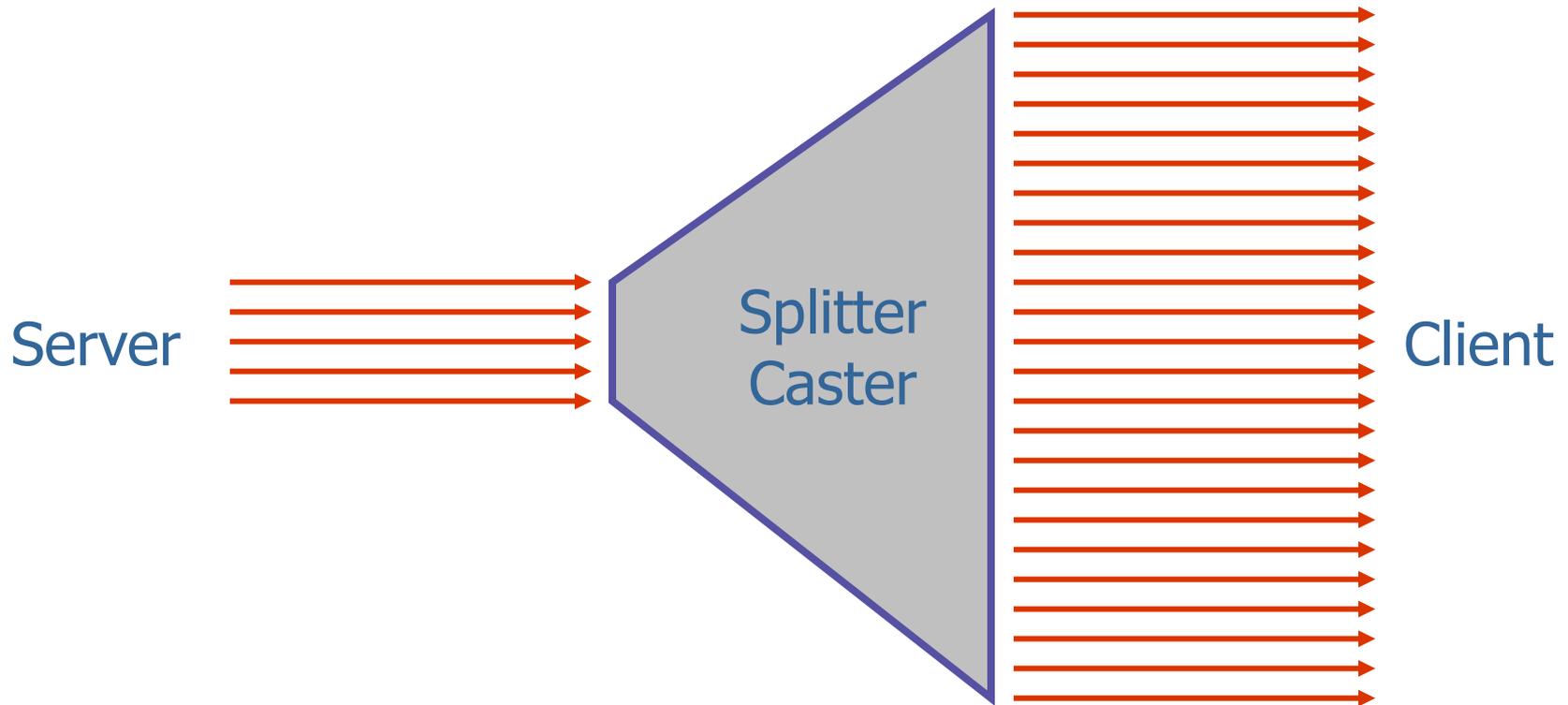
Networked Transport of RTCM via Internet Protocol (Ntrip)



- GPRS/UMTS Mobile Internet
- Based on HTTP



GNSS Internet Radio / IP-Streaming



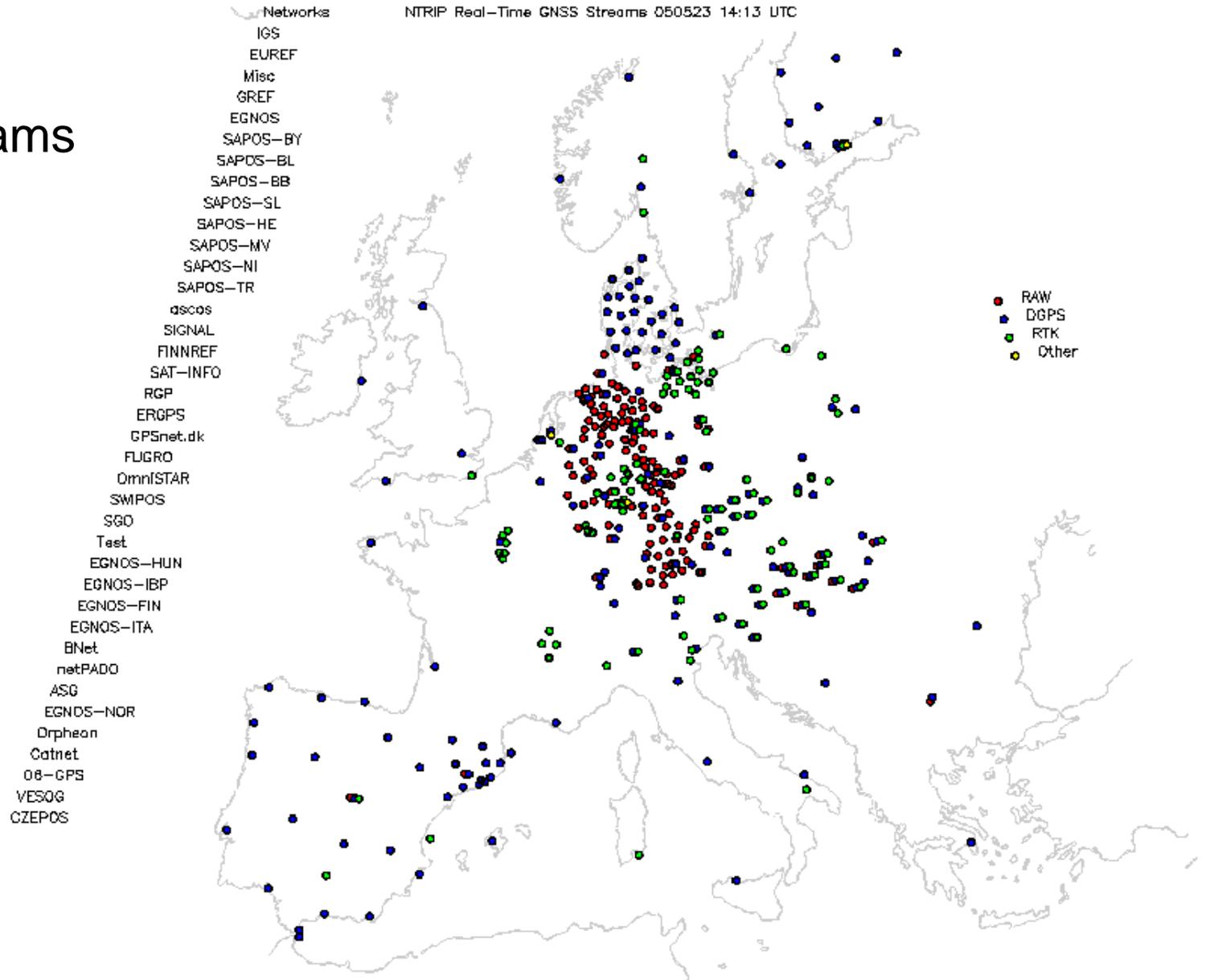
~5 kbit/s per GNSS Stream max.

European Status of Ntrip Real-Time GNSS Reference Networks

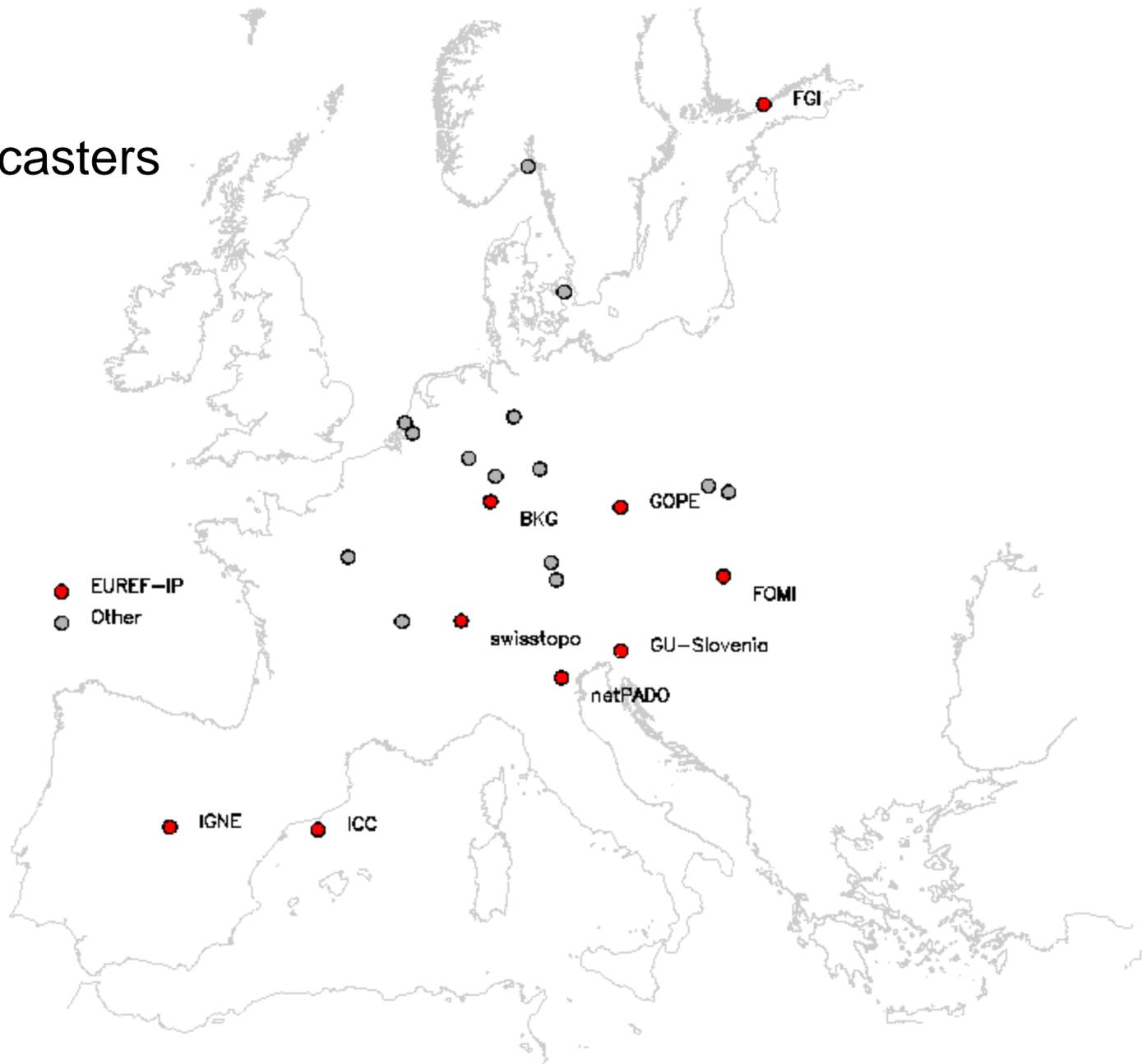
Who participates in



Ntrip Streams Europe

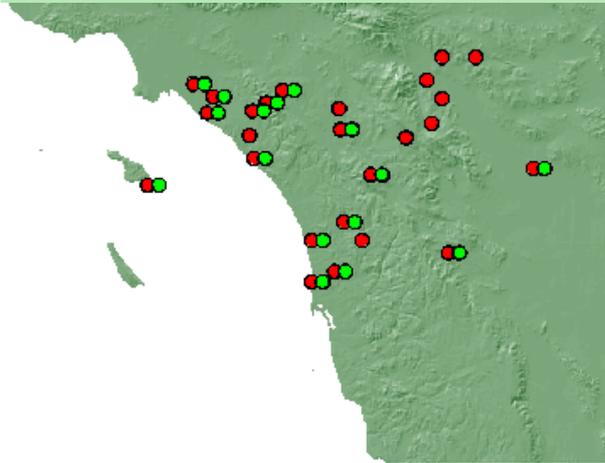


Ntrip Broadcasters Europe



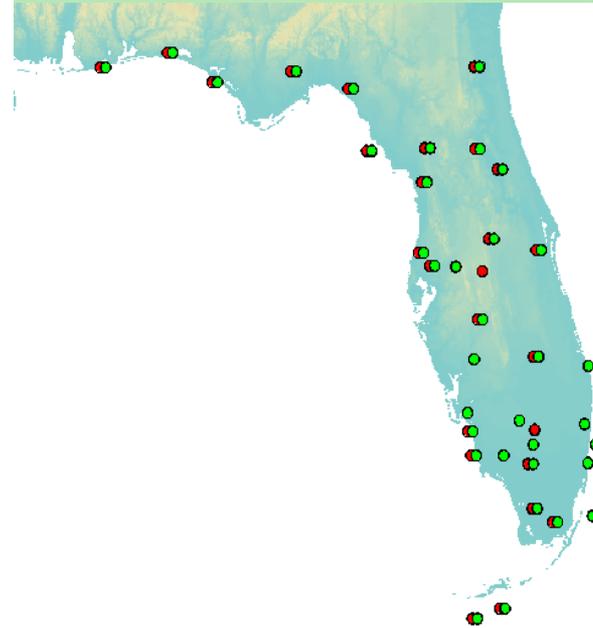
US Ntrip Broadcasting Examples

SCIGN / SOPAC



First: Erlanger (ERLA), KY

FDOT / RTKLink



Operated by NCAD since Oct 2003

Real-Time GNSS Reference Networks

- Why?
- And what for?

Hourly / Daily RINEX Upload

- Why deliver a daily newspaper monthly?

Post-Processing

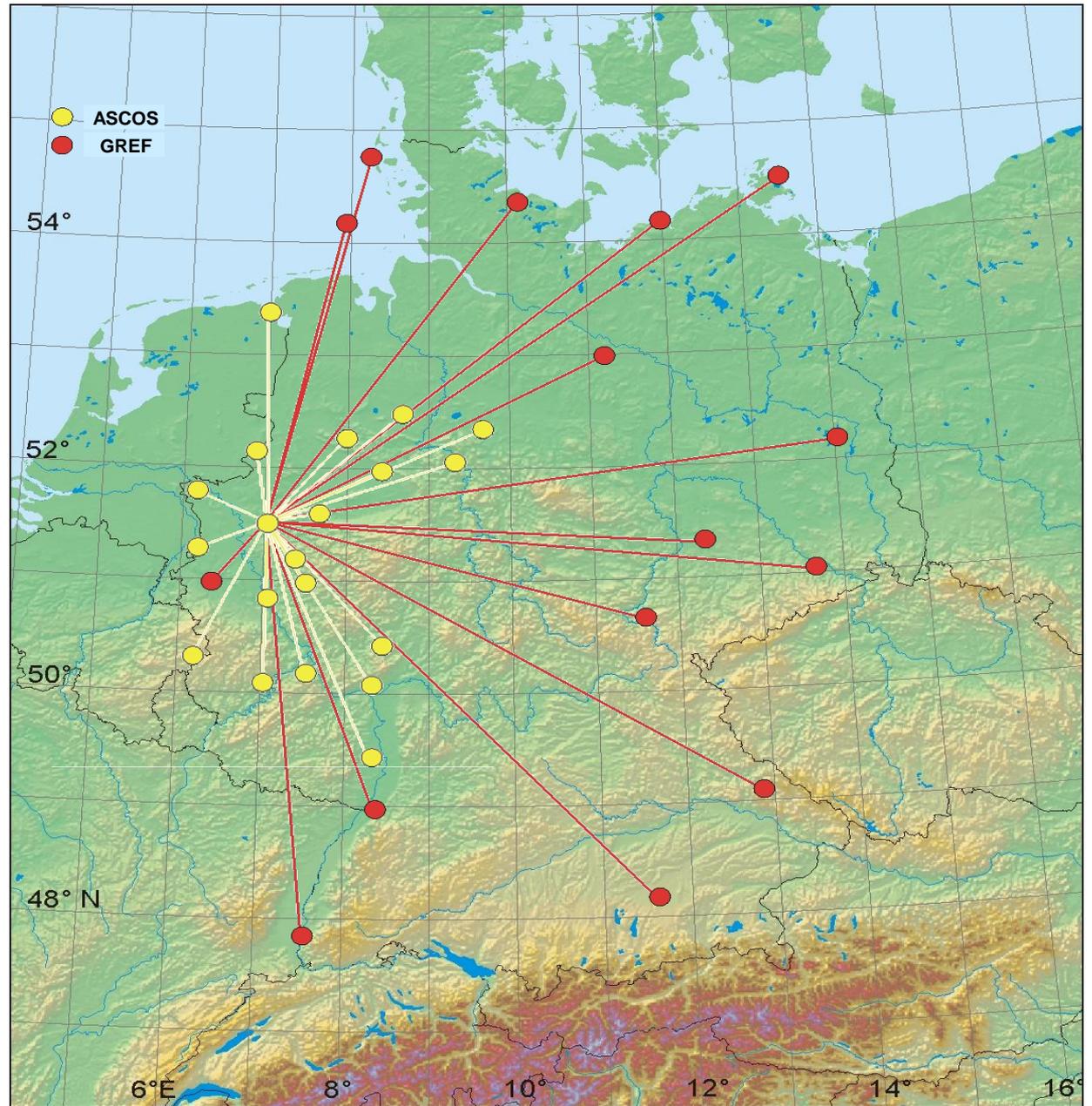


Versus

Real-Time



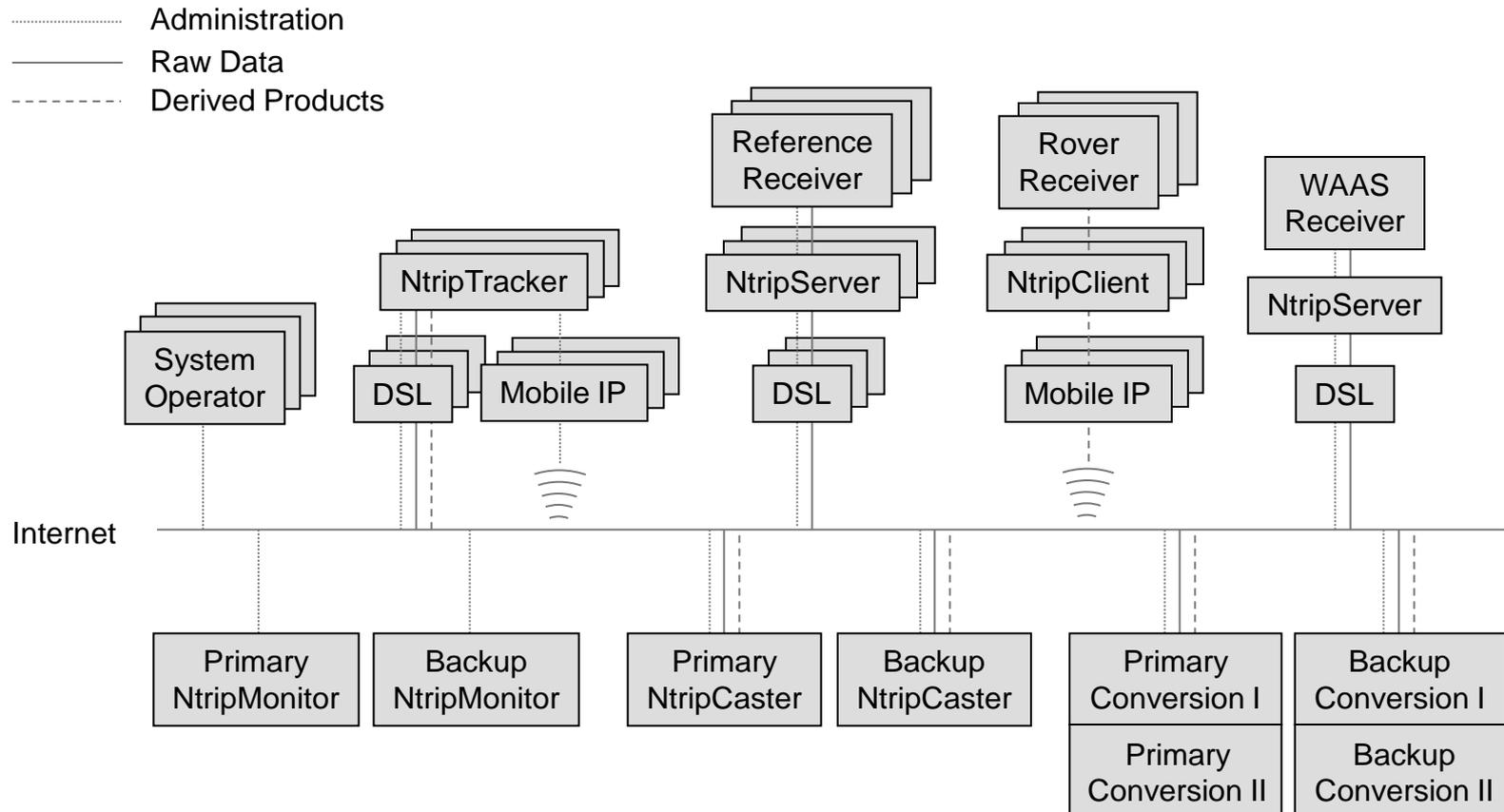
Example for
continuously aligning
Reference System of
Networked RTK Service
to ITRF / ETRS89



Real-Time Broadcast - Product Areas

- Satellite Orbits, Clocks
- Ephemerides
- Troposphere
- Ionosphere
- Space-Weather
- Satellite Health
- Interference
- Natural Hazards
- DGPS/RTK

Ntrip GNSS Broadcast Service Concept



Under discussion within European National Mapping Agencies:

- Common adaptation or even development of GNSS software package (real-time GPS engine) within the framework of EUREF.
- Long-term usage and maintenance to follow model adopted for handling of Bernese post-processing software (access to source code).

Real-Time GNSS Policy Recommendations

- Upgrade all CORS stations to real-time
- Pick up any stream continuously made available
- Support formats accepted by client software
- Disseminate high-rate data
- Setup network of Ntrip Broadcasters
- Monitor stream flow and content
- Assist existing real-time services
- Participate in global stream exchange
- Start with pilot project – Call for participation